

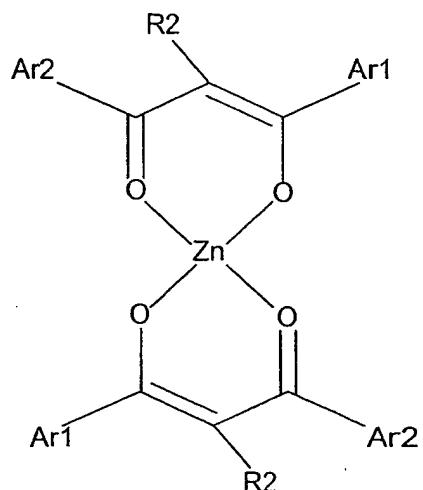
CLAIMS

Therefore, the following is claimed:

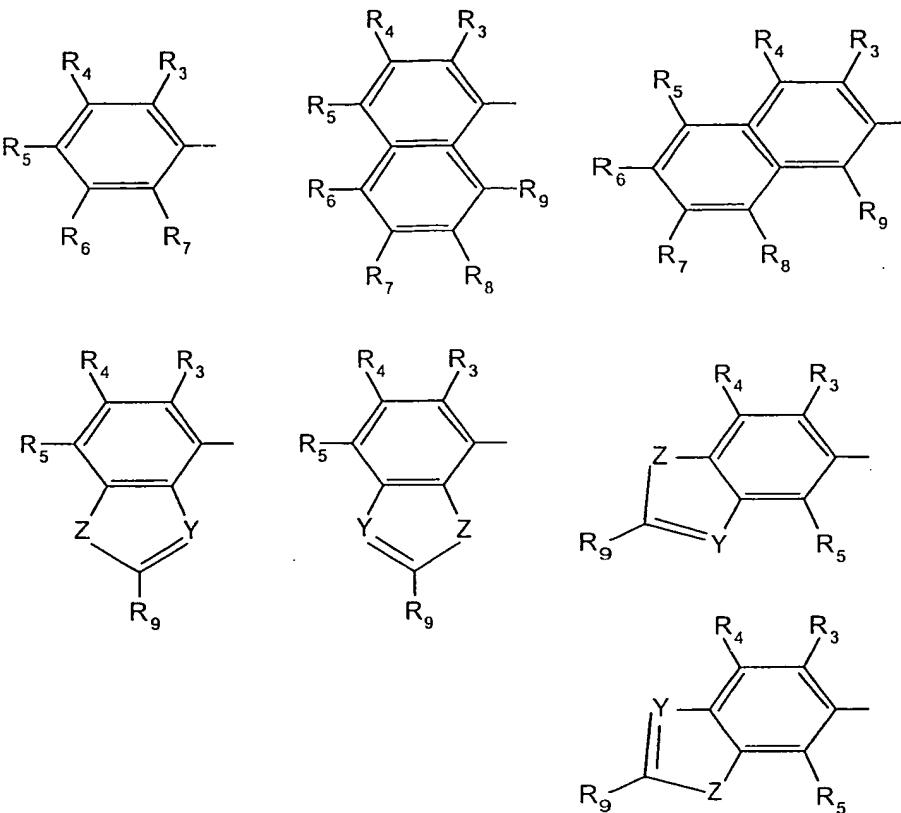
1 1. A method of treating cancer or a tumor comprising administering to a host in
2 need of treatment an effective amount of at least one HIF-1 inhibitor
3 composition, wherein the HIF-1 inhibitor composition comprises a bidentate
4 zinc chelate.

1 2. The method of claim 1, wherein the bidentate zinc chelate comprises a beta-
2 diketone bidentate zinc chelate compound.

1 3. The method of claim 2, wherein the beta-diketone bidentate zinc chelate
2 compound has the following structure:



3 wherein Ar₁ and Ar₂ each are individually selected from at least one of the following :

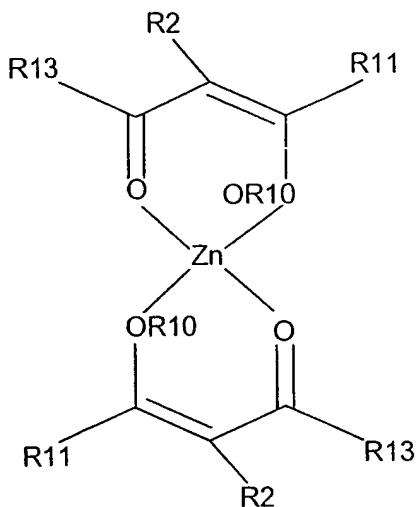


5 wherein R2, R3, R4, R5, R6, R7, R8, and R9 are each individually selected
6 from at least one of: hydrogen, alkyl groups, aryl groups, halo groups, hydroxy
7 groups, alkoxy groups, alkylamino groups, dialkylamino groups, acyl groups,
8 carboxyl groups, carboamido groups, sulfonamide groups, aminoacyl groups,
9 amide groups, amine groups, nitro groups, organo selenium compounds,
10 hydrocarbons, and cyclic hydrocarbons.

1 4. The method of claim 3, wherein the beta-diketone compound comprises a
2 dibenzoylmethane-type compound.

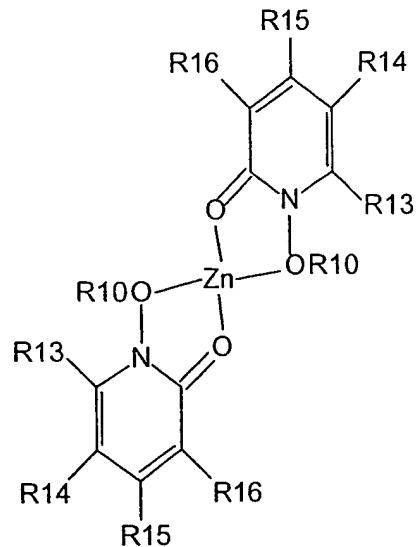
1 5. The method of claim 3, wherein the dibenzoylmethane-type compound
2 comprises dibenzoylmethane.

1 6. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



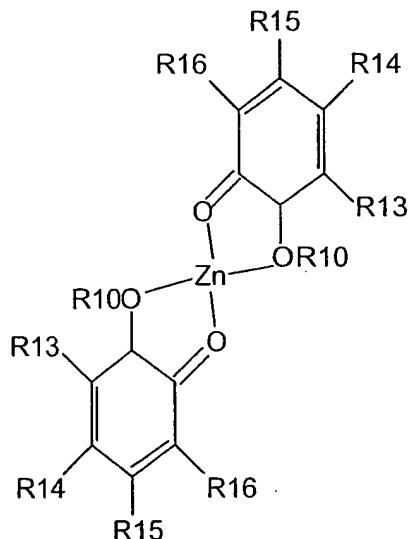
3 wherein R10 is selected from hydrogen and a sulfonyl group, and wherein R2,
4 R11, and R13 are each individually selected from hydrogen, alkyl groups, aryl
5 groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 7. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:
3



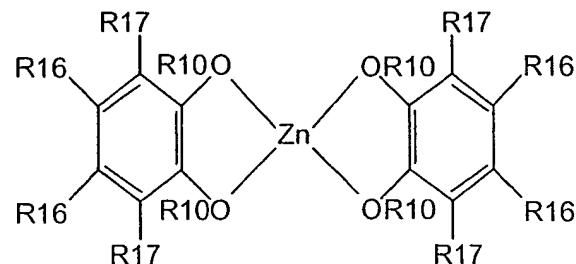
wherein R10 is selected from hydrogen and a sulfonyl group, and wherein R13, R14, R15, and R16 are each individually selected from hydrogen, alkyl groups, aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups, dialkylamino groups, acyl groups, carboxyl groups, carboamido groups, sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 8. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



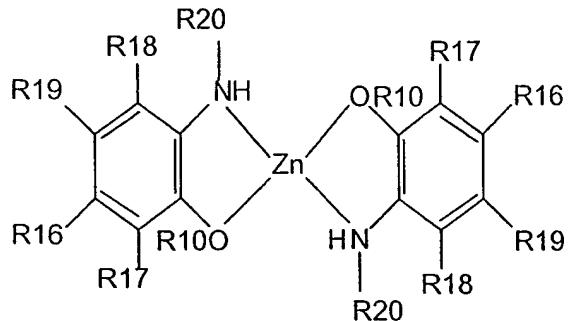
3 wherein R10 is selected from hydrogen and a sulfonyl group, and wherein
4 R13, R14, R15, and R16 are each individually selected from hydrogen, alkyl
5 groups, aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino
6 groups, dialkylamino groups, acyl groups, carboxyl groups, carboamido
7 groups, sulfonamide groups, aminoacyl groups, amide groups, amine groups,
8 nitro groups, organo selenium compounds, hydrocarbons, and cyclic
9 hydrocarbons.

1 9. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



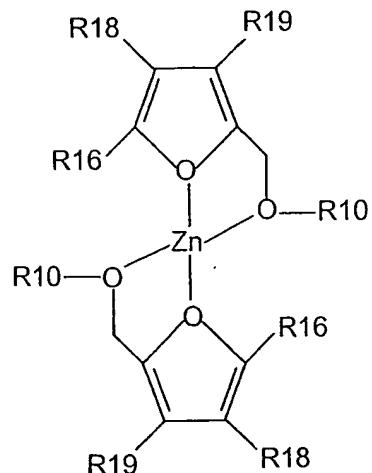
3 wherein R10 is selected from hydrogen and a sulfonyl group, and wherein R16
4 and R17 are each individually selected from hydrogen, alkyl groups, aryl
5 groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 10. The method of claim 1, wherein the bidentate zinc chelate has the following
· 2 structure:



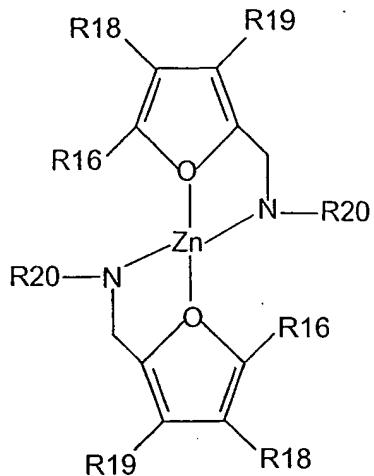
3 wherein R10 and R20 are selected from hydrogen and a sulfonyl group, and
4 wherein R16, R17, R18, and R19 are each individually selected from
5 hydrogen, alkyl groups, aryl groups, halo groups, hydroxy groups, alkoxy
6 groups, alkylamino groups, dialkylamino groups, acyl groups, carboxyl groups,
7 carboamido groups, sulfonamide groups, aminoacyl groups, amide groups,
8 amine groups, nitro groups, organo selenium compounds, hydrocarbons, and
9 cyclic hydrocarbons.

1 11. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



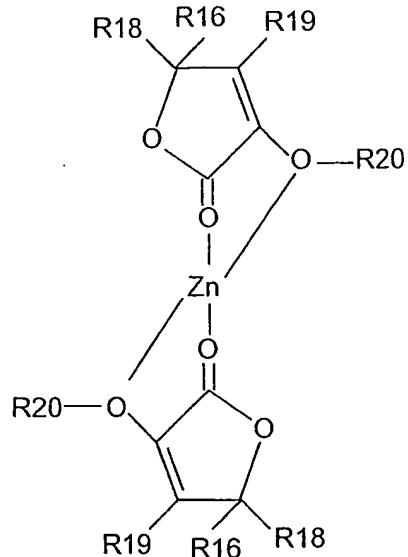
3 wherein R10 is selected from hydrogen and a sulfonyl group, and wherein
4 R16, R18, and R19 are each individually selected from hydrogen, alkyl groups,
5 aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 12. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



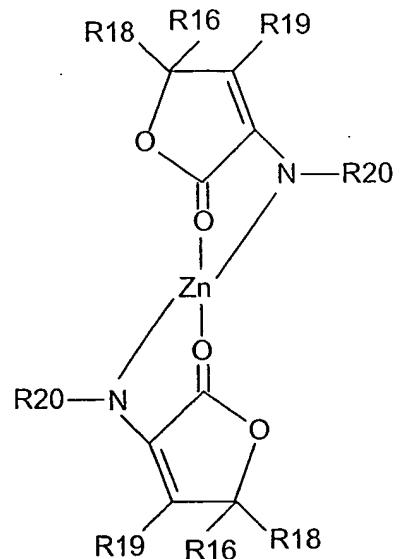
3 wherein R20 is selected from hydrogen and a sulfonyl group, and wherein
4 R16, R18, and R19 are each individually selected from hydrogen, alkyl groups,
5 aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 13. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



3 wherein R10 is selected from hydrogen and a sulfonyl group, and wherein
4 R16, R18, and R19 are each individually selected from hydrogen, alkyl groups,
5 aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

1 14. The method of claim 1, wherein the bidentate zinc chelate has the following
2 structure:



3 wherein R20 is selected from hydrogen and a sulfonyl group, and wherein
4 R16, R18, and R19 are each individually selected from hydrogen, alkyl groups,
5 aryl groups, halo groups, hydroxy groups, alkoxy groups, alkylamino groups,
6 dialkylamino groups, acyl groups, carboxyl groups, carboamido groups,
7 sulfonamide groups, aminoacyl groups, amide groups, amine groups, nitro
8 groups, organo selenium compounds, hydrocarbons, and cyclic hydrocarbons.

- 1 15. The method of claim 1, 3, and 6 through 13, wherein the cancer or tumor is
2 selected from the group consisting of bladder cancer, breast cancer, colorectal
3 cancer, endometrial cancer, head and neck cancer, leukemia, lung cancer,
4 lymphoma, melanoma, non-small-cell lung cancer, ovarian cancer, prostate
5 cancer, testicular cancer, uterine cancer, cervical cancer, thyroid cancer, gastric
6 cancer, brain stem glioma, cerebellar astrocytoma, cerebral astrocytoma,
7 ependymoma, Ewing's sarcoma family of tumors, germ cell tumor,
8 extracranial cancer, Hodgkin's disease, leukemia, acute lymphoblastic
9 leukemia, acute myeloid leukemia, liver cancer, medulloblastoma,
10 neuroblastoma, brain tumors generally, non-Hodgkin's lymphoma,
11 osteosarcoma, malignant fibrous histiocytoma of bone, retinoblastoma,
12 rhabdomyosarcoma, soft tissue sarcomas generally, supratentorial primitive
13 neuroectodermal and pineal tumors, visual pathway and hypothalamic glioma,
14 Wilms' tumor, acute lymphocytic leukemia, adult acute myeloid leukemia,
15 adult non-Hodgkin's lymphoma, chronic lymphocytic leukemia, chronic
16 myeloid leukemia, esophageal cancer, hairy cell leukemia, kidney cancer,
17 multiple myeloma, oral cancer, pancreatic cancer, primary central nervous
18 system lymphoma, skin cancer, and small-cell lung cancer.
- 1 16. The method of claim 1, 3, and 6 through 13, further comprising treating the
2 host with at least one conventional anticancer treatment chosen from radiation
3 and chemotherapy.

- 1 17. The method of claim 1, 3, and 6 through 13, further comprising treating the
2 host with at least one conventional anticancer agent selected from an
3 antibiotic, anti-inflammatory, anti-oxidant, analgesic, radioisotope, nascopine,
4 paclitaxel, nocodazole, vinca alkaloids, adriamycin, alkeran, Ara-C, BiCNU,
5 busulfan, CCNU, carboplatinum, cisplatinum, cytoxan, daunorubicin, DTIC,
6 5-FU, fludarabine, hydrea, idarubicin, ifosfamide, methotrexate, mithramycin,
7 mitomycin, mitoxantrone, nitrogen, mustard, velban, vincristine, VP-16,
8 gemcitabine, herceptin, irinotecan, camptosar, CPT-11, leustatin, navelbine,
9 rituxan, STI-571, taxotere, topotecan, hycamtin, xeloda capecitabine, zavelin,
10 and combinations thereof.

- 1 18. The method of claim 2, wherein the beta-diketone compound includes
2 pharmaceutically acceptable salts of the beta-diketone compounds,
3 pharmaceutically acceptable prodrugs of the beta-diketone compounds, beta-
4 diketone compound derivatives, and combinations thereof.

- 1 19. The method of claim 18, wherein the beta-diketone compound includes a
2 dibenzoylmethane-type compound, and wherein the dibenzoylmethane-type
3 compound includes pharmaceutically acceptable salts of the
4 dibenzoylmethane-type compounds, pharmaceutically acceptable prodrugs of
5 the dibenzoylmethane-type compounds, dibenzoylmethane-type compound
6 derivatives, and combinations thereof.

- 1 20. A chemopreventative method of prophylactically treating cancers or tumors
2 comprising administering to a host in need of treatment an effective amount of
3 at least one bidentate zinc chelate of claims 3 and 6 through 14.

- 1 21. The chemopreventative method of claim 20, wherein the bidentate zinc chelate
2 includes pharmaceutically acceptable salts of the bidentate zinc chelate,
3 pharmaceutically acceptable prodrugs of the bidentate zinc chelate, bidentate
4 zinc chelate derivatives, and combinations thereof.

- 1 22. The chemopreventative method of claim 20, wherein the bidentate zinc chelate
2 includes a hydrolysis, an oxidation, or a reduction reaction product of the
3 bidentate zinc chelate.
- 1 23. A pharmaceutical composition comprising at least one bidentate zinc chelate
2 in combination with a pharmaceutically acceptable carrier, wherein the at least
3 one bidentate zinc chelate is present in a dosage level effective to treat cancers
4 or tumors of claims 3 and 6 through 14.
- 1 24. The pharmaceutical composition of claim 23, wherein the bidentate zinc
2 chelate includes pharmaceutically acceptable salts of the bidentate zinc
3 chelate, pharmaceutically acceptable prodrugs of the bidentate zinc chelate,
4 bidentate zinc chelate derivatives, and combinations thereof.
- 1 25. The pharmaceutical composition of claim 23, wherein pharmaceutical
2 composition can be administered orally, rectally, parenterally,
3 intrasystemically, intravaginally, intraperitoneally, topically, and buccally.
- 1 26. The pharmaceutical composition of claim 23, wherein the bidentate zinc
2 chelate includes a hydrolysis, a oxidation, or a reduction reaction product of
3 the bidentate zinc chelate.
- 1 27. A method for the treatment or prevention of a hypoxia-related pathology
2 comprising: administering to a host in need of such treatment an HIF-1
3 inhibiting amount of at least one of the bidentate zinc chelate of claims 3 and 6
4 through 14.
- 1 28. A method of modulating HIF-1 activity in a cell comprising: contacting the
2 cell with an HIF-1 inhibiting amount of at least one of the bidentate zinc
3 chelate of claims 3 and 6 through 14.

1 29. A method of downregulating HIF-1 activity in a cell comprising: contacting
2 the cell with an HIF-1 inhibiting amount of at least one of the bidentate zinc
3 chelate of claims 3 and 6 through 14.

1 30. A method of treating or preventing cancer or a tumor in a host comprising
2 administering to the host a HIF-1 inhibiting amount of at least one of the
3 bidentate zinc chelate of claims 3 and 6 through 14.

1 31. A method of modulating gene transcription in a cell comprising contacting the
2 cell with an HIF-1 inhibiting amount of at least one of the bidentate zinc
3 chelate of claims 3 and 6 through 14.

1 32. The method of claim 31, wherein the cell is a cancer cell.

1 33. The method of claim 31, wherein the cell is a tumor cell.